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N735 N74X N851 N854
U1S S1820 S1934

(56) Documents Cited

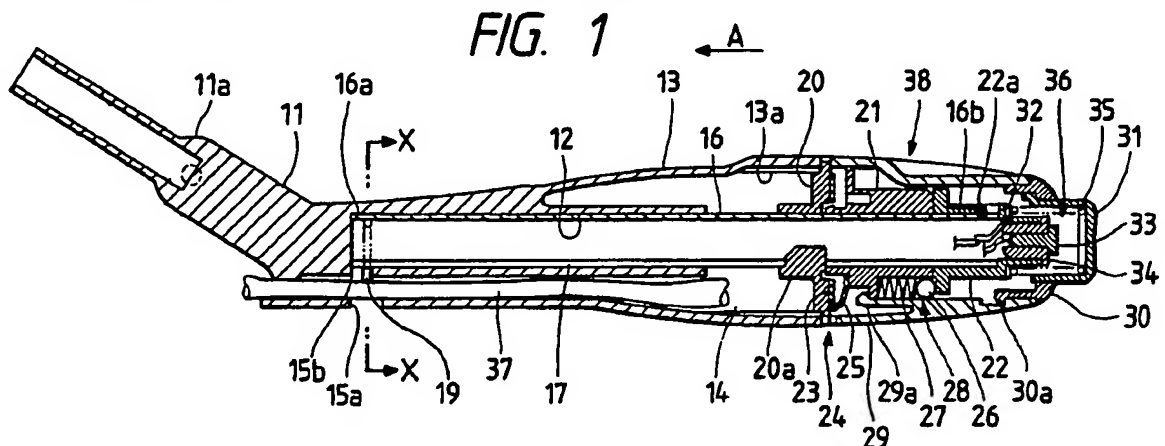
US 5107243 A US 4315117 A

(58) Field of Search

UK CL (Edition M) H1N NBG NGA NGB NGF NPKA
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(54) Lever switch

(57) A lever switch which can be disassembled readily enabling the components to be replaced comprises a lever shaft 16 inserted into an insertion portion 12 of a lever holder 11 with one end 16b protruding from the holder 11 and a retaining device such as a C-ring 19 which detachably secures the lever shaft 16 in the insertion portion 12 of the lever holder 11. In disassembling the lever switch, the lever shaft 16 is separated from the lever holder 11 by removing the C-ring 19 from the lever shaft with a suitable tool, whereby a group of components can be removed from the lever shaft with ease.



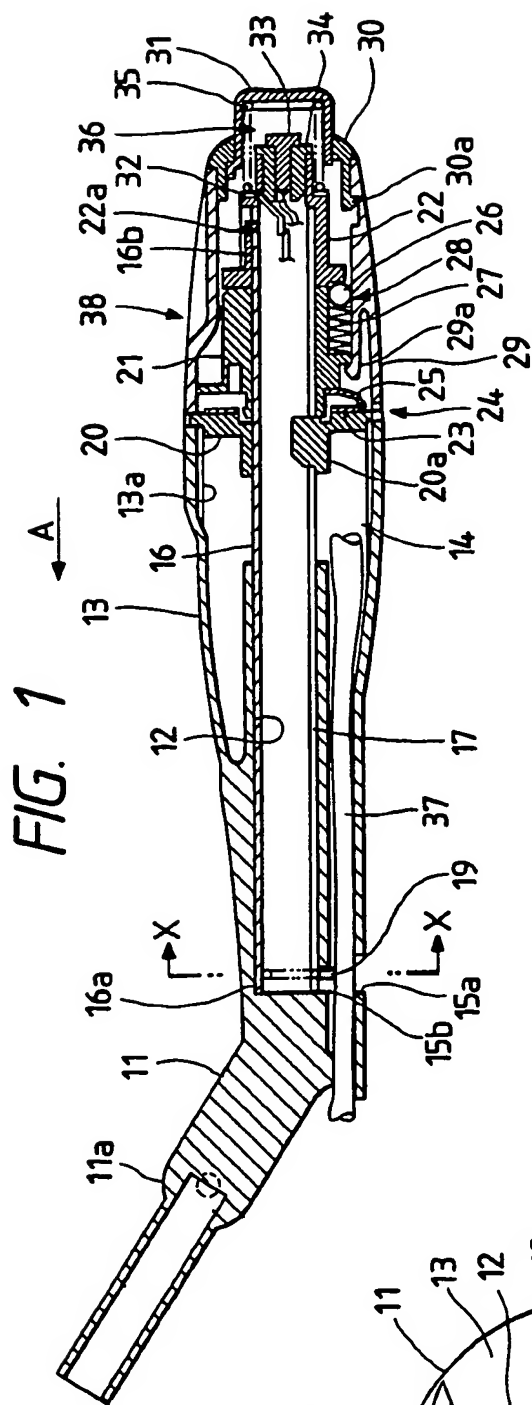


FIG. 3

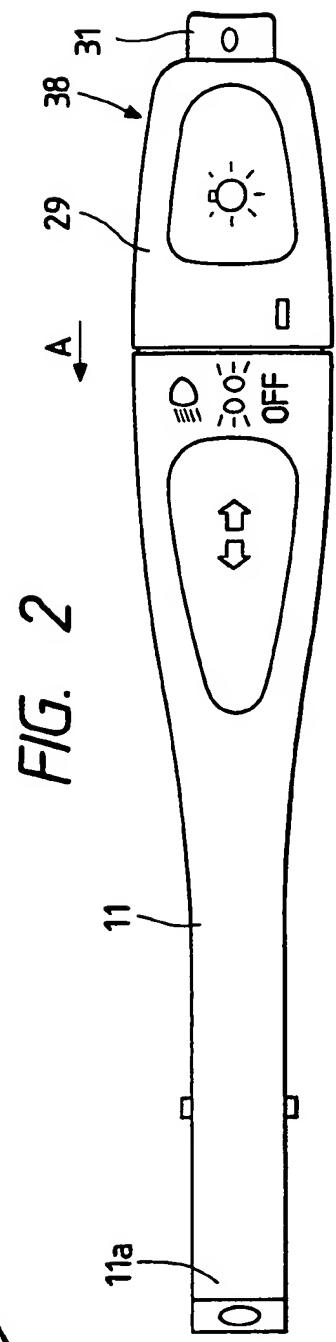
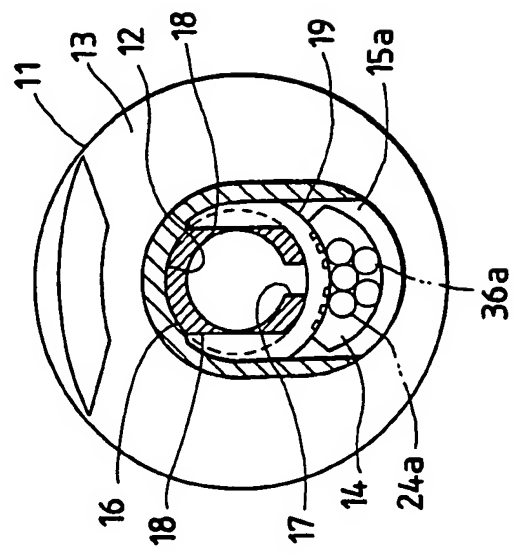


FIG. 4

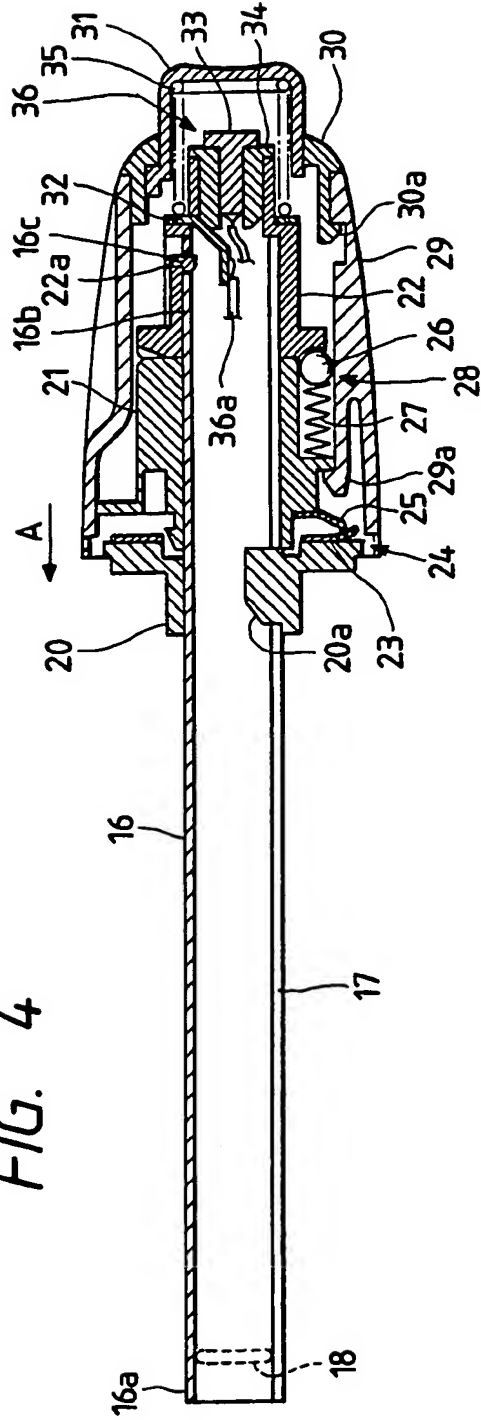
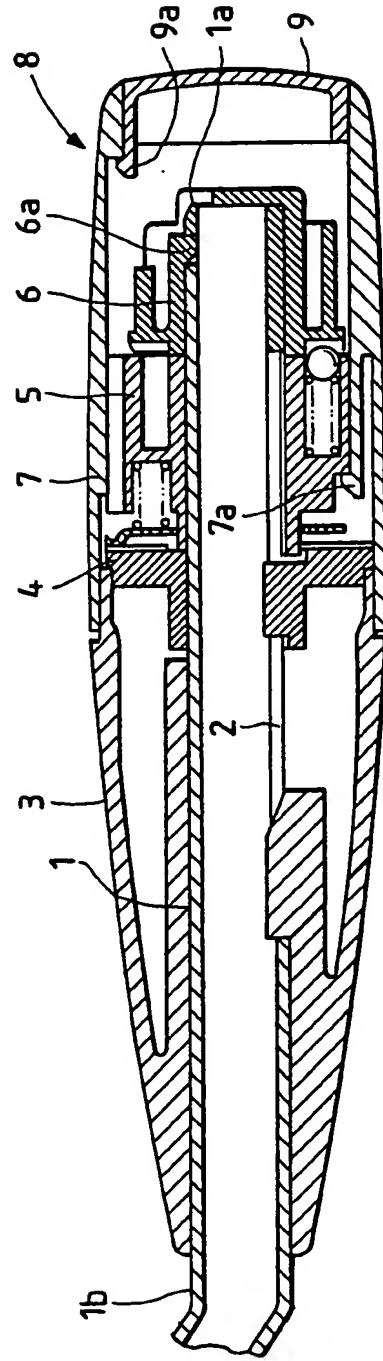


FIG. 5



LEVER SWITCH DEVICE

BACKGROUND OF THE INVENTIONField of the invention

This invention relates to a lever switch device
5 provided, for instance, on the steering column of an
automobile.

Related Art

A lever switch device serving, for instance, as a light
switch of an automobile is as shown in FIG. 5. In the lever
10 switch device, a slit 2 is formed in a lever shaft 1 made of a
metal pipe in such a manner that it is extended from the tip
end portion 1a of the lever shaft 1 to the middle of the base
end portion 1b. A group of components 8, namely, a knob lower
3, an insulator 4, a contact holder 5, a stator 6, and a knob
15 upper 7 are put on the lever shaft 1 being moved from the side
of the tip end portion 1a in the stated order. The base end
portion 1b of the lever shaft 1 is swingably coupled to the
base of the steering column.

More specifically, the knob upper 7 embraces the
20 components 4, 5 and 6, and its elastic pawl 7a is engaged with
the contact holder 5, so that the knob upper 7 is rotatable
around the lever shaft 1 together with the contact holder 5.
A cap 9 is coupled to the end portion of the knob upper 7 with
the aid of its elastic pawl 9a. The stator 6 is engaged with
25 the lever shaft 1 through its engaging pawl 6a, so that the

stator 6 is prevented from moving along the lever shaft 1 and from turning around the latter 1.

On the other hand, in order to improve the recycling or replacing of the components of the lever switch device, there
5 has been a strong demand for provision of a lever switch device which can be disassembled with ease.

In the case of the above-described conventional lever switch device, it is difficult to remove the components from the lever shaft 1; that is, if they are forcibly removed from
10 it, then they may be broken.

SUMMARY OF THE INVENTION

In view of the foregoing, an object of this invention is to provide a lever switch device which can be disassembled readily, thus contributing to the recycling or replacing of the
15 components.

The foregoing object of the invention has been achieved by the provision of a lever switch device which, according to the invention, comprises:

a lever holder having a cylindrical insertion portion,
20 the base end portion of which is coupled to a base;

a lever shaft having the base end portion of which is inserted into the insertion portion of the lever holder in such a manner that the tip end portion thereof is protruded from the lever holder;

a group of components including switch components which are mounted on the lever shaft being moved from the side of the tip end portion of the lever shaft; and

5 a retainer which is detachably engaged with the lever shaft being inserted through the outer periphery of the insertion portion, to prevent the lever shaft from coming off the lever holder.

10 With the lever switch device of the invention, the lever shaft is disengaged from the lever holder by removing the retainer from the outer periphery of the insertion portion of the lever holder, whereby the group of components can be removed from the lever shaft with ease.

BRIEF DESCRIPTION OF THE DRAWINGS

15 FIG. 1 is a longitudinal sectional view showing the arrangement of a lever switch device, which constitutes one embodiment of this invention;

FIG. 2 is a plan view showing the external appearance of the lever switch device according to the invention;

20 FIG. 3 is an enlarged sectional view taken along line X-X in FIG. 1;

FIG. 4 is a longitudinal sectional view showing a lever shaft removed from a lever holder in the device of the invention; and

25 FIG. 5 is a longitudinal sectional view of a conventional lever switch device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A lever switch device, which constitutes one embodiment of this invention, will be described with reference to FIGS. 1 through 4.

5 As shown in FIGS. 1 and 2, the lever switch device of the invention has a lever holder 11 which is slightly L-shaped. The base end portion 11a of the lever holder 11 is swingably coupled to the base of a steering column (not shown).

The lever holder 11 comprises a cylindrical insertion
10 portion 12 which is opened at the right end, and a surrounding wall 13 formed around the insertion portion 12. The lever holder 11 has a lead wire inserting hole 14 at a predetermined position between the insertion portion 12 and the surrounding wall 13 of the lever holder 11. The insertion portion 12 and
15 the surrounding wall 13 have openings 15a and 15b, respectively, which are open downwardly when the lever holder 11 is coupled to the base of the steering column.

The lever switch device further comprises a lever shaft 16 which is made of a metal pipe. The base end portion 16a of
20 the lever shaft 16 is inserted into the insertion portion 12 being moved from the side of the open end of the insertion portion 12 (from the right side in FIG. 1). When the base end portion 16a has been inserted therein, the tip end portion 16b is protruded from the insertion portion 12. The lever shaft
25 16, as shown best in FIG. 4, has a slit 17 which is extended axially and opened at both ends.

As shown in FIG. 3, two engaging grooves 18 and 18 are formed in the outer surface of the base end portion 16a of the lever shaft 16. A retainer, namely, a C-ring 19 is detachably engaged with the engaging grooves 18 and 18 through the above-described openings 15a and 15b, so that the lever shaft 16 is prevented from coming off the lever holder 11. In this operation, the C-ring 19 is held in the engaging grooves 18 and 18 by its own elasticity. An engaging hole 16c is formed in the tip end portion 16b of the lever shaft 16 at a predetermined position as shown in FIG. 4.

An insulator 20, a contact holder 21, and a stator 22, which are all annular, are put on the lever shaft being moved from the side of the tip end portion 16b.

The insulator 20 is prevented from moving in the direction of the arrow A (to the left in FIG. 1) by a rib 13a formed on the surrounding wall 13 of the lever holder 11. The insulator 20 has a protrusion 20a on its inner cylindrical surface in such a manner that the protrusion 20a is extended inside the lever shaft 16 through the slit 17, so that it prevents the insulator 20 from turning around the axis. A stationary contact 23 is provided on the right end face of the insulator 20.

The contact holder 21 is rotatable around the lever shaft 16. A movable contact 25 is provided on the left end face of the contact holder 21, forming a light switch 24 with

the stationary contact 23. Therefore, the light switch 24 is operated when the contact holder 21 turns.

5 The stator 22 has an engaging pawl 22a on its inner cylindrical surface, which is engaged with the engaging hole 16c of the lever shaft 16 to prevent the stator 22 from moving axially and turning around the axis. An articulation mechanism 28 comprising a ball 26 and a spring 27 is interposed between the stator 22 and the contact holder 21, to hold the contact holder 21 at the turn position.

10 The device further comprises a knob upper 29 which is cylindrical. The knob upper 29 is put on the lever shaft 16 being moved from the side of the tip end portion 16b, in such a manner that it covers the insulator 20, the contact holder 21, and the stator 22.

15 The left end portion of the knob upper 29 is rotatably engaged with the end portion of the surrounding wall 13 of the lever holder 11. The knob upper 29 has an engaging pawl 29a, which is engaged with the contact holder 21, so that the knob upper 29 can be turned together with the contact holder 21. 20 Hence, the above-described light switch 24 is operated by turning the knob upper 29.

A cap 30 is engaged through an engaging pawl 30a to the right end portion of the knob upper 29. A push button 31 is inserted into the cap 30 in such a manner that it is prevented 25 from coming off the latter.

A terminal ring 32 is mounted the right end portion of the stator 22, and a contact point 33 is inserted through a bushing 34 into the right end portion of the stator 22. An electrically conductive compression spring 35 is interposed
5 between the terminal 32 and the push button 31.

The terminal ring 32, the contact point 33, and the compression spring 35 form a light washer switch 36. The light washer switch 36 is turned on as follows: When the push button 31 is pushed in, the compression spring 35 is brought into
10 contact with the contact point 33, so that the switch 36 is turned on.

The lead wire 36a of the light washer switch 36 is extended through the inside of the lever shaft 16 and the lead wire inserting hole 14 toward the base. The lead wire 24a (cf.
15 FIG. 3) is extended through the lead wire inserting hole 14 towards the base. In FIG. 1, reference numeral 37 designates a cover inserted into the lead wire inserting hole 14.

Hereinafter, the insulator 20, the contact holder 21, the stator 22, the knob upper 29, the cap 30, the push button
20 31, the terminal ring 32, the contact point 33, the compression spring 35, and the switch components around the lever shaft 16 will be referred to as "a group of components 38", when applicable.

The lever switch device assembled as shown in FIGS. 1
25 and 2 may be disassembled as follows. First, the C-ring 19 is

taken out through the openings 15a and 15b of the lever holder 11 with a suitable tool.

The lever shaft 16 with the group of components 38 is removed from the insertion portion 12 of the lever holder 11 by pulling it in the direction opposite to the direction of the arrow A (to the right in FIG. 1) (cf. FIG. 4).

In the lever shaft 16 thus removed, as shown in FIG. 4 there is nothing to obstruct the movement of the insulator 20 in the direction of the arrow A, and therefore the insulator 20 can be removed from the lever shaft 16 by moving it in the direction of the arrow A, and then the movable contact 25 of the light switch 24 can be removed.

A suitable tool such as a screw driver is inserted into the left end portion of the knob upper to disengage the engaging pawl 29a of the knob upper 29 from the contact holder 21. As a result, the knob upper 29 can be moved along the lever shaft 16 in the direction opposite to the direction of the arrow A. As the knob upper 29 is moved in this manner, the cap 30, the push button 31, and the compression spring 35 are also removed from the lever 16.

When the knob upper 29 has been removed in the above-described manner, there is nothing to obstruct the movement of the contact holder 21 in the direction of the arrow A (to the left in FIG. 1), and therefore the contact holder 21 can be removed from the lever shaft 16 by moving it in the direction of the arrow A.

Thereafter, the engaging pawl 22a of the stator 22 is disengaged from the lever shaft 16 by using a suitable tool, so that the stator 22 is removed from the lever shaft 16.

If summarized, with the lever switch device of the invention, the lever shaft 16 is disengaged from the lever holder 11 by removing the C-ring 19 from the outer periphery of the insertion portion 12, whereby the group of components 38 can be removed from the lever shaft 16 with ease. This feature contributes to the recycling or replacing of the components.

While the preferred embodiment of this invention has been described, it should be noted that the invention is not limited thereto or thereby. For instance, the C-ring employed as the retainer may be replaced by a pin or a screw which can be detachably engaged with the lever shaft 16. That is, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention.

As is apparent from the above description, with the lever switch device of the invention, the lever shaft is disengaged from the lever holder 11 by removing the retainer from the outer periphery of the insertion portion, whereby the group of components can be removed from the lever shaft with ease. Hence, the lever switch device can be disassembled readily. This feature contributes to the recycling or replacing of the components.

Claims:

- 1 1. A lever switch device comprising:
2 a lever holder having a cylindrical insertion member
3 and a base end member of which is coupled to a base;
4 a lever shaft including a base end member being
5 inserted into said insertion member of said lever holder in
6 such a manner that the tip end portion of said lever shaft is
7 protruded from said lever holder;
8 a plurality of components including switch components
9 which are mounted on said lever shaft from the side of the tip
10 end portion of said lever shaft; and
11 retainer means for detachably engaging said lever shaft
12 through an outer periphery of said insertion member to prevent
13 said lever shaft from coming off said lever holder.
- 1 2. A lever switch device as claimed in claim 1 wherein the
2 retainer means includes a C-ring which is engaged with a
3 engaging groove defined in an outer surface of said base end
4 member of said lever shaft.
- 1 3. A lever switch device as claimed in claim 1, wherein
2 said lever shaft is disengaged from said lever holder by
3 removing said retainer means to remove said components from
4 said lever shaft.

Patents Act 1977**Examiner's report to the Comptroller under Section 17 - 11-
(The Search report)**Application number
GB 9322974.8**Relevant Technical Fields**

(i) UK Cl (Ed.M) H1N (NBG, NGA, NGB, NGF, NPKA, NUA, NUG)

(ii) Int Cl (Ed.5) B60Q; H01H

Search Examiner
MR P CORBETTDate of completion of Search
25 JANUARY 1994**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1-3**Categories of documents**

- X:** Document indicating lack of novelty or of inventive step. **P:** Document published on or after the declared priority date but before the filing date of the present application.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category. **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art. **&:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	US 5107243	(MAEDA) - see Figure 1	1-3
X	US 4315117	(KOKUBU) - see lines 52-60, column 4	1,3

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).